COV

RESEARCH › RESEARCH SUMMARIES

Sharing our progress toward recovery

Research Summaries

Discover what the latest science from the RECOVER Initiative means for our ability to understand, diagnose, prevent, and treat **Long COVID**.

This page contains descriptions of findings from **RECOVER research studies**. These descriptions use plain language and a format that is easy to understand.

If you want to learn more about the scientific discoveries described here, you can also browse and search the complete list of **RECOVER Publications**.

54 Results

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● EHR ■ ADULT ◆ NEW-ONSET AND PRE-EXISTING CONDITIONS

Are fewer cases of diabetes mellitus diagnosed in the months after SARS-CoV-2 infection? A

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Science

The relationship between COVID-19 and diabetes has captured the interest of many researchers. Some studies suggest that people may be more likely to develop type 2 diabetes after having COVID. The authors of this study tried to find out whether new diagnoses of type 2 diabetes are more common after having COVID. They did this by looking at electronic health records (EHRs), which are digital medical charts that have health data like doctor visits, lab results, and other health history.

The researchers looked at the EHRs of people across the country who had COVID and were also diagnosed with type 2 diabetes within 6 months before or after having COVID. They found that the number of new diagnoses increased during the period when people had COVID, likely due to increased interaction with the healthcare system during that time. However, the average number of new diabetes diagnoses was about 83% lower in the 6 months after having COVID than in the 6 months before having COVID. This analysis could not explain whether having COVID makes people more likely to get diabetes, but it does include the unexpected finding that a diabetes diagnosis was less common months after having COVID.

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REVIEW ADULT

Therapeutic trials for Long COVID-19: A call to action from the interventions taskforce of the RECOVER Initiative

Bonilla, H; Peluso, MJ; Rodgers, K; et al., *Frontiers in Immunology*

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of the biological causes of Long COVID symptoms and conditions. The purpose of this study is to help guide future research by summarizing the current state of the science as a call for urgent and efficient research to help the millions who continue to suffer from Long COVID around the world.

Researchers identified a number of studies that attempted to treat the various symptoms and conditions of Long COVID that may be useful to consider or incorporate when designing a larger research project aimed at treating the underlying biological cause of those symptoms and conditions.

VIEW FULL PUBLICATION

REVIEW ADULT

Pathogenic mechanisms of post-acute sequelae of SARS-CoV-2 infection (PASC)

Sherif, ZA; Gomez, CR; Connors, TJ; et al., *eLife*

RECOVER researchers conducted a detailed review of published papers that try to explain how the COVID-19 virus causes the symptoms and conditions associated with Long COVID. Researchers compared how Long COVID is similar to other long-standing viral conditions (such as Epstein Barr virus, commonly known as Mono) to see if there is a common method used by COVID-19 and these other viral conditions to cause the associated symptoms and conditions.

RECOVER researchers believe that there is no one common method by which the COVID-19 virus causes the symptoms and conditions associated with Long COVID. Because there was no observed common method causing these Long COVID symptoms, researchers recommend

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● EHR ■ ADULT ◆ HEALTH DISPARITIES

◆ NEW-ONSET AND PRE-EXISTING CONDITIONS

Coding Long COVID: Characterizing a new disease through an ICD-10 lens

Pfaff, ER; Madlock-Brown, C; Baratta, JM; et al., *BMC Medicine*

RECOVER researchers looked at the use of a code to diagnose Long COVID in electronic health records (EHRs). They used EHR data from over 8,000 people and compared people who had the ICD-10 code for Long COVID (which is U09.9) in their EHR on or after October 1, 2021. They also looked at other codes in their EHR for health conditions, symptoms, tests, and treatments within 60 days after their Long COVID diagnosis.

Researchers found that many doctors use the Long COVID code along with other codes. People with Long COVID had a mix of symptoms and other health conditions, tests, and treatments. This suggests there may be different types of Long COVID. The researchers concluded that for now, doctors should look at a person's mix of symptoms and other health conditions to diagnose Long COVID.

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● EHR ■ ADULT

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In this study, RECOVER researchers used a computer program to identify possible types of Long COVID based on electronic health records (EHRs). They used the computer program to review EHRs of people diagnosed with Long COVID and group them based on patterns in their symptoms and health conditions.

The computer program found 6 different types of Long COVID, which were related to 1) many symptoms and health conditions with unusual lab test results, 2) the lungs, 3) the brain, 4) the heart, 5) pain and feeling weak and tired (fatigue), and 6) many symptoms and conditions with pain. Each type of Long COVID also differed based on health conditions people had before COVID and how severe their COVID infection was. This research could help identify people with different types of Long COVID to better diagnose and treat them and invite them to join research studies.

VIEW FULL PUBLICATION

● EHR ■ ADULT ◆ NEW-ONSET AND PRE-EXISTING CONDITIONS

◆ VIRAL VARIANTS

Data-driven identification of post-acute SARS-CoV-2 infection subphenotypes

Zhang, H; Zang, C; Xu, Z; et al., *Nature Medicine*

RECOVER researchers wanted to learn if there are different types of Long COVID based on symptoms and health problems that often happen together. Researchers used data from electronic health records (EHRs) of about 35,000 people diagnosed with COVID. The EHRs were from 2 healthcare systems in PCORnet, the National Patient-Centered Clinical Research Network. They used a computer program to look for patterns in

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and health problems that happen together. The 4 types of Long COVID are related to the 1) heart and kidneys, 2) breathing, sleep, and anxiety, 3) muscles and nerves, and 4) digestive tract and breathing. This research could help define types of Long COVID to give people more specific diagnoses and treatment plans.

Research Summary (PDF, 192 KB)

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EHR PEDIATRIC BROAD SYMPTOMS

NEW-ONSET AND PRE-EXISTING CONDITIONS

Clinical features and burden of postacute sequelae of SARS-CoV-2 infection in children and adolescents

Rao, S; Lee, GM; Razzaghi, H; et al., *JAMA Pediatrics*

RECOVER researchers used data in electronic health records (EHRs) from children's hospitals that were a part of the National Pediatric Learning Health System Network (PEDSnet). Researchers looked for symptoms, health conditions, and medicines children had about 1 to 6 months after a COVID test. They compared children who did and didn't have COVID to learn how many children who had COVID got Long COVID, and symptoms and health problems Long COVID causes in children.

The researchers learned that Long COVID is uncommon in children and happens in about 4% of children with COVID compared to in about 5% - 21% of adults with COVID. They also learned the Long COVID symptoms and health conditions that happen most often in children include changes in smell or taste hair loss, trouble breathing, and inflammation (swelling) in the heart or muscles.

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EHR ADULT RISK FACTORS

Identifying who has Long COVID in the USA: A machine learning approach using N3C data

Pfaff, ER; Girvin, AT; Bennett, TD; et al., *The Lancet Digital Health*

RECOVER researchers wanted to learn if a computer program could identify if people have Long COVID based on electronic health records (EHRs). They used EHRs from the National COVID Cohort Collaborative (N3C). Researchers created and used a computer program to compare people with Long COVID to those who didn't have Long COVID (based on whether or not people had a visit to a Long COVID clinic in their EHR). The computer program looked for patterns in people's symptoms, health conditions, and other data.

The researchers concluded their computer program could be used to identify people with possible Long COVID. The computer program found that people with Long COVID have patterns in their health care visits, age groups, symptoms and health conditions, and the medicines they take. This could help connect people with Long COVID to health care or invite them to join research studies.

Research Summary (PDF, 73 KB)

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EHR ADULT PEDIATRIC BROAD SYMPTOMS

NEW-ONSET AND PRE-EXISTING CONDITIONS VACCINATION

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Block, JP; Boehmer, TK; Forrest, CB; et al., *Morbidity and Mortality Weekly Report (MMWR)*

Heart problems after having COVID and after getting an mRNA COVID vaccine

RECOVER researchers used data from over 15 million people's electronic health records (EHR) to compare how many people have heart problems after having COVID or getting an mRNA COVID vaccine. They used EHR data from 40 health systems in PCORnet, the National Patient Centered Clinical Research Network.

Researchers found that the chance of having heart problems is higher after having COVID than after getting an mRNA COVID vaccine for men and women in all age groups. The overall chance of having heart problems after having COVID or getting an mRNA COVID vaccine was very low across all ages and genders. These results support the continued use of mRNA COVID vaccines for all people ages 5 and older, who meet the vaccine criteria.

Research Summary (PDF, 111 KB)

Video: Lead Author Dr. Jason Block (YouTube)

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